Structured Programming Language (CSE113)
Lecture # 10
Patterns Display in C Programming

Create a program to display the following cases using for loops:

case 1: 1 1 2 1 2 3 1 2 3 4 1 2 3 4 5	**case 2:** 1 2 3 4 5 1 2 3 4 1 2 3 1 2 1	**case 3:** 1 2 1 3 2 1 4 3 2 1 5 4 3 2 1	**case 4:** 5 4 3 2 1 4 3 2 1 3 2 1 2 1 1
case 5: 1 2 2 3 3 3 4 4 4 4 5 5 5 5 5	**case 6:** 5 5 5 5 5 4 4 4 4 3 3 3 2 2 1	**case 7:** * * * * * * * * * * * * * * *	**case 8:** * * * * * * * * * * * * * * *
case 9: 5 4 4 3 3 3 2 2 2 2 1 1 1 1 1	**case 10:** 1 1 1 1 1 2 2 2 2 3 3 3 4 4 5	**case 11:** 1 0 0 1 1 1 0 0 0 0 1 1 1 1 1	**case 12: Floyd's Triangle** 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
case 13: 1 2 3 3 4 5 4 5 6 7 5 6 7 8 9	**case 14:** 5 6 7 8 9 4 5 6 7 3 4 5 2 3 1	**case 15:** Square star patter ***** * * * * * * *****	**case 16:** Rectangular star pattern ********** * * * * * * **********
case 17: Pascal's triangle 1 1 1 1 2 1 1 3 3 1 1 4 6 4 1 1 5 10 10 5 1		**case 18: Pyramid/triangle using numbers** 1 2 1 2 3 2 1 2 3 4 3 2 1 2 3 4 5 4 3 2 1 2 3 4 5 6 5 4 3 2 1 2 3 4 5 6 7 6 5 4 3 2 1 2 3 4 5 6 7	
case 19: Pyramid/triangle using numbers 1 1 2 1 1 2 3 2 1 1 2 3 4 3 2 1 1 2 3 4 5 4 3 2 1 1 2 3 4 5 6 5 4 3 2 1 1 2 3 4 5 6 7 6 5 4 3 2 1		**case 20: Pyramid/triangle using *** *	

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1. Write C program to print half pyramid using numbers.

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = 1; r <= t; r++){
      for(c = 1; c <=r; c++){
         printf("%d ",c);
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No. of rows you want to display: 5
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

2. Write C program to print inverted half pyramid using numbers

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = t; r >= 1; r--){
      for(c = 1; c <=r; c++){
         printf("%d ",c);
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No. of rows you want to display: 5
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

3. Write C program to print half pyramid using numbers.

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = 1; r <= t; r++){
      for(c = r; c >=1; c--){
         printf("%d ",c);
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No. of rows you want to display: 5
1
2 1
3 2 1
4 3 2 1
5 4 3 2 1
```

4. Write C program to print inverted half pyramid using numbers.

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = t; r >= 1; r--){
      for(c = r; c >=1; c--){
         printf("%d ",c);
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No. of rows you want to display: 5
5 4 3 2 1
4 3 2 1
3 2 1
2 1
1
```

5. Write C program to print triangle number pattern.

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = 1; r <= t; r++){
      for(c = 1; c <=r; c++){
         printf("%d ",r);
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No. of rows you want to display: 5
1
2 2
3 3 3
4 4 4 4
5 5 5 5 5
```

6. Write C program to print inverted triangle number pattern.

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = t; r >= 1; r--){
      for(c = 1; c <=r; c++){
         printf("%d ",r);
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No. of rows you want to display: 5
5 5 5 5 5
4 4 4 4
3 3 3
2 2
1
```

7. Write C program to print half pyramid using *

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = 1; r <= t; r++){
      for(c = 1; c <=r; c++){
         printf("* ");
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No. of rows you want to display: 6
*
* *
* * *
* * * *
* * * * *
* * * * * *
```

8. Write C program to print inverted half pyramid using *

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = t; r >= 1; r--){
      for(c = 1; c <=r; c++){
         printf("* ");
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No. of rows you want to display: 6
* * * * * *
* * * * *
* * * *
* * *
* *
*
```

9. Write C program to print triangle number pattern.

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = 1; r <= t; r++){
      for(c = 1; c <=r; c++){
         printf("%d ",t-r+1);
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No. of rows you want to display: 5
5
4 4
3 3 3
2 2 2 2
1 1 1 1 1
```

10. Write C program to print inverted triangle number pattern.

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = t; r >= 1; r--){
      for(c = 1; c <=r; c++){
         printf("%d ",t-r+1);
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No. of rows you want to display: 5
1 1 1 1 1
2 2 2 2
3 3 3
4 4
5
```

11. Write C program to print triangle number pattern using 0 and 1.

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = 1; r <= t; r++){
      for(c = 1; c <= r; c++){
         if(r%2 == 1) printf("1 ");
         else printf("0 ");
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No. of rows you want to display: 5
1
0 0
1 1 1
0 0 0 0
1 1 1 1 1
```

12. Write C program to print Floyd's Triangle.

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   int count = 1;
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = 1; r <= t; r++){
      for(c = 1; c <= r; c++){
         printf("%d ",count);
         count++;
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No of rows you want to display: 5
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
```

13. Write C program to print triangle number pattern.

Source Code	**Output**
see code below	see output below

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   int temp;
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = 1; r <= t; r++){
      temp = r;
      for(c = 1; c <= r; c++){
         printf("%d ",temp);
         temp++;
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No. of rows you want to display: 5
1
2 3
3 4 5
4 5 6 7
5 6 7 8 9
```

14. Write C program to print inverted triangle number pattern.

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   int temp;
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = t; r >= 1; r--){
      temp = r;
      for(c = 1; c <= r; c++){
         printf("%d ",temp);
         temp++;
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No. of rows you want to display: 5
5 6 7 8 9
4 5 6 7
3 4 5
2 3
1
```

15. Write C program to print hollow square star pattern.

Source Code

```
#include<stdio.h>
int main()
{
   int t,r,c; //t=totalRows,r=rows,c=columns
   printf("No. of rows you want to display: ");
   scanf("%d",&t);
   for(r = 1; r <= t; r++){
      for(c = 1; c <= t; c++){
         if(r == 1 || c == 1 || r == t || c == t)
            printf("*");
         else printf(" ");
      }
      printf("\n");
   }
   return 0;
}
```

Output

```
No of rows you want to display: 5
*****
*   *
*   *
*   *
*****
```

17. Write C program to print Pascal's triangle.

Source Code

```
#include<stdio.h>
long factorial(int n);
int main()
{
   int n,rows,cols,result,space;
   printf("No of rows you want to display: ");
   scanf("%d",&n);
   for(rows = 0; rows < n; rows++) {
      for(space = 0; space <= (n-rows-2); space++) {
         printf(" ");
      }
      for(cols = 0; cols <= rows; cols++){
         result = factorial(rows)/(factorial(cols)*factorial(rows-cols));
         printf("%d ",result);
      }
      printf("\n");
   }
   return 0;
}
long factorial(int n){
   if(n == 0) return 1;
   return n*factorial(n-1);
}
```

Output

```
No of rows you want to display: 6
     1
    1 1
   1 2 1
  1 3 3 1
 1 4 6 4 1
1 5 10 10 5 1
```

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